A Work Project presented as part of the requirements for the Award of a Master Degree in Economics from INSPER and a Master Degree in Finance from the NOVA – School of Business and Economics.

ANGEL, SEED AND FOUNDERS INFLUENCE ON FINTECH FUNDING:

AN EMERGING MARKET CONTEXT.

Luisa Herck Giaquinto - 32454

A Project carried out under the supervision of:

Adriana Bruscato Bortoluzzo – INSPER

And

Paulo Soares de Pinho – NOVA SBE

2018

ANGEL, SEED AND FOUNDERS INFLUENCE ON FINTECH FUNDING: AN EMERGING MARKET CONTEXT.

By GIAQUINTO LUISA H.

This study examines the difference between FinTechs that received private equity and venture capital finance with those that did not receive. We test this with a sample of 2,524 companies across 76 countries over 2008-2018. We find that country-specific determinants of start-up funding are also relevant to FinTechs. Furthermore, companies in financing and payments categories are more likely to receive funding. We show a positive relationship between having received an angel and a seed round with follow-on finance, and a negative relationship with having a single founder. The impact of the seed finance and the single founder is weaker in an emerging market.

Keywords: FinTech, Start-up Funding, CrunchBase, Early-stage Finance

1. Introduction

Start-ups have attracted public and academic attention over the last years. If new ventures are beneficial for economic growth because of job creation, and of innovation spread (Rajan and Zingales, 1998). Then, FinTechs have even more impact on the economy by reducing inefficiency, and by increasing the access to financial products (Leong et al, 2017). FinTechs may reshape the financial industry with better quality service at lower costs (Lee and Shin, 2018). According to PWC (2016), 83% of financial institutions activity are at risk by FinTechs, and Goldman Sachs (2015) estimates that the FinTech sector worth $4.7 trillion.

Just like any start-up, FinTechs face high failure risk mainly when early-stage finance is not available to support the first years of negative cash flow (Hoenig, and Henkel, 2014). Private Equity (PE) and Venture capital (VC) firms fill the funding gap for those high-risk high-growth companies (Gompers and Lerner, 1998). According to CB Insights (2018), FinTech funding reached a record of $27.4 billion. Early-stage investment has long been an understudied subject due to the lack of data. CrunchBase has foster researchers on corporate financing over the last decade (Dalle at al., 2017). Investigating the determinants of PE/VC investment is crucial for policymakers to design public incentives for entrepreneurship, and for entrepreneurs who are looking for financing their business (Alemany and Villanueva, 2014).

We followed 2,524 FinTechs, for 10 years, to identify what differs between companies that received and did not receive PE/VC finance. We categorized FinTechs into five groups to control for the product or service offered. We tested two hypotheses: first, the positive impact of the angel or the seed as a quality certification for follow-on finance (Werth and Boeert, 2013; Croce et al., 2018; Lerner et al., 2018). Second, the negative influence of having a single founder on PE/VC finance compared to team founders which enjoy the complementary networking, skills, and industry knowledge (Stam and Schutjens., 2005; Spiegel at al., 2013).

Our empirical model includes many of the macroeconomic determinants already tested in previous studies, namely GDP growth, economic freedom, financial development, R&D

expenses, and corporate taxes (Gompers and Lerner, 1998; Félix et al., 2007; Cherif and Gazdar, 2011; Nofsinger and Wang, 2011; Mihai, 2015). This work contributes to the existing literature in FinTech by investigating if start-up funding determinants are also applicable to this sector. To date, relatively few studies have investigated the FinTech market in its entirety and using quantitative models (Cumming and Schwienbacher, 2018).

FinTechs have become a global phenomenon as more deals are taking place in South America and Asia (CB Insights, 2018). Indeed, the need for financial inclusion is preeminent in emerging markets where the percentage of the unbanked population is higher and small firms face more credit restrictions (Zalan and Toufaily, 2017). A growing number of papers on entrepreneurial finance uses cross-countries panel data. Groh and Wallmeroth (2016) suggest that venture capital determinants differ according to the developmental stage of a country, both in the direction and the magnitude.

The originality of this paper is not only to focus on a specific industry - the FinTech sector - but also to investigate how the developmental stage of a country interferes in some companies-specific characteristics. The developmental stage of a country interferes in its entrepreneurial ecosystem which in turn interferes in the entrepreneurial funding. Our sample comprises 76 countries which we split into emerging and developed market according to the International Monetary Fund (IMF) GDP per capita definition of 2018. Therefore, we create three interaction terms between the angel, the seed and the single founder with the emerging market.

2. Literature review and hypothesis formulation

FinTech, the short for Financial Technology firms, involves the design and the delivery of financial products through technology (Leong et al., 2017). The term FinTech is from the early 1990s when a Citigroup project created the abbreviation for "Financial Services Technology Consortium" (Arner et al., 2015). FinTech got momentum, from 2008 to 2018,

global searches on the Google browser for the term "FinTech" have grown 25 times according to Google Trends. In 2008, FinTech investment was still only a $1 billion business. In 2017, however, it reached a record of $27.4 billion (CB Insights, 2018).

FinTech covers the entire scope of services traditionally provided by the financial industry (Arner et al., 2015). For instance, lending, payment, insurance, wealth management, and so on. Those companies usually have a disruptive business model which cuts costs. Operational efficiency comes from branchless banking, transformation in customer acquisition or retention, real-time transactions, credit monitoring, fewer regulators barriers and, fewer legacy IT systems. The Fintech revolution may force the whole financial sector to improve the quality of services (Lee and Shin, 2018). According to PWC (2016), 83% of the activities performed in the financial institutions are at risk by FinTechs, and Goldman Sachs (2015) estimates that the FinTech sector worth $4.7 trillion.

FinTech expansion has the potential to fill the gap in available financial services, to both retail and business customers, therefore, reducing existing inefficiencies. These inefficiencies are typically high in emerging countries where small business face more credit constraints and the population has less access to financial products. For instance, The Global Findex a World Bank database shows that 94% of adults have an account in developed economies, while only 63% do in emerging markets. According to Leong (2017), Financial services can help drive development by reducing the cost of receiving payment or by allowing people to save and invest in their health and education. For instance, FinTechs were able to increase the offer of small loans as the technology has reduced transaction costs.

FinTechs benefits are conditional to their survival. CB Insights (2017) reported the top 20 reasons for start-up failure and placed "run out of cash" in the second position. Start-ups have limited borrowing capacity because of intangible assets and expected years of negative earnings. FinTechs face even stronger funding constraints for financial sector regulations (Haddad and Hornuf, 2016). Private Equity (PE) and Venture capital (VC) firms offer a

financing option for start-ups which are unlikely to receive a bank loan (Gompers and Lerner, 1998). Banks loan usually offer a debt against the future payment of a principal plus interest, while PE/VC invest capital purchasing equity stakes. They typically keep the equity for a limited period, around 10 years, with the aim to increase the company value before they exit (Tykvova, 2018). PE/VC firms are intermediaries that invest capital from investors, such as pension funds, family office, and insurance companies into financing young firms with high-growth potential (Hoenig and Henkel, 2014).

Accessing PE/VC capital is a very competitive race for entrepreneurs who are looking for capital. Investors initial screening is a rapid review of multiple projects to assess the one that merits further analysis, 70% of the rejections occur at first sight (Riding et al., 2007). PE/VC firms face difficulty in assessing start-up potential because of information asymmetry within entrepreneurs. This asymmetry increases with the lack of track performance or revenue (Nofsinger and Wang, 2011). To evaluate a start-up potential, investors observe attributes presumably correlated with further performance (Stuart et al., 1999). Early stage investors typically analyze the quality of the entrepreneur, the attractiveness of the market, and the characteristics of the product (Alemany and Villanueva, 2014).

Angel and seed investors are the first sources of external capital to start-ups. Business angels are wealthy former entrepreneurs who place their own money into early stage entrepreneurial ventures, while seed represents a more formal option for early stage capital made by professional investors (Croce et al., 2018). The funding process may start with a business angel, then, seed finance to finally reach venture capital and private equity; the latter can have follow-on rounds in series A, B, C. However, some start-ups may directly receive seed or PE/VC finance without having an angel or a seed experience. Sequential investment occurs because of complementary gains. To exemplify, angel typically have limited capital and venture capital provide growth opportunities for the firms in which they have invested in (Croce et al., 2018).

Angel and seed investors learn about new opportunities through referrals and business associations groups (Alemany and Villanueva, 2014). They face less agency problem in monitoring a start-up because they heavily rely on relational governance (Croce et al., 2018). Having entrepreneurial experience, angel and seed are typically active investors who monitor strategy and investment decisions to support start-up growth (Cherif and Gazdar, 2011). In addition, they provide access to consultants, to investment bankers, and to lawyers (Gompers and Lerner, 1998).

Early stage investors have a positive impact on the growth of firms they fund, both in terms of performance and survival (Lerner et al., 2018). They play a crucial role in expanding start-up networking and in facilitating further investment. A start-up financed by a well-connected business angel is more likely to receive subsequent funding rounds (Werth and Boeert, 2013). Given the high information asymmetry between PE/VC firms and entrepreneurs (Stuart et al., 1999), having received an angel and seed round provide a valuable signal to entrant investors, similar to a certification of the deal quality (Croce et al., 2018).

H1: Angel positively impact the probability of receiving PE/VC Funds

H2: Seed positively impact the probability of receiving PE/VC Funds

Investors use factors of the entrepreneurial team as the minimum qualification during the screening stage. Expected future return and reputation serve as signals of positive returns. (Gompers and Lerner, 1998). The educational and the professional experience of the founding team attracts venture capital attention as an observable sign of quality (Hoenig, and Henkel, 2014; Gompers and Lerner, 1998). For instance, a venture managed by an experienced founder get in average 4.44% more external financing (Nofsinger and Wang, 2011). An experiment with the crowd-funding AngelList revealed that business angels respond to information about the founding team (Bernstein at al.,2016). The platform has sent e-mails to potential investors

providing information about new opportunities and recorded that they usually decided to learn more about the founding team (Bernstein at al.,2016).

Team start-up has the benefit to complement founders networking and skills (Spiegel at al., 2013). Multiple founders should increase the number of skills and industry-specific knowledge available in the start-up which are stronger predictors of performance. Team start-ups have significantly higher capital than single founder (Stam and Schutjens, 2005). Team founders appear to achieve better performance than single founder start-ups. For instance, a research comparing 90 teams and 1196 single start-ups in The Netherlands showed that team start-ups perform better: only 13.5% of team companies closed against 18% of the single founder, and 4.5% of team start-ups got sold against only 2% of the single founder (Stam and Schutjens, 2015).

H3: Single founder negatively impact the probability of receiving PE/VC Funds

The main originality of this paper is to investigate how the impact of the angel, the seed, and the single founder differ according to the developmental stage of a country. To the best of our knowledge, no previous research has focused on this question. The fact that countries have different entrepreneurial ecosystems inspired the formulation of hypothesis four, five, and six. The work from Groh and Wallmerot (2016) is a source of inspiration, they investigated the determinants of venture capital and concluded that the developmental stage of a country impacts the magnitude and direction of funding determinants.

The entrepreneurial ecosystem differs among countries, credit abundancy in developed countries, such as The United States, reduces start-ups need to raise an angel round before getting seed funds (Lerner et al., 2018). Hence, angel finance may have a strong impact in the emerging market. As new entrepreneurs face more constraints accessing external sources of capital in emerging markets, the seed market is smaller and more competitive (Wu and Si,

2016). According to Lerner (2018), entrepreneurs who are looking for capital in an emerging market may self-censored themselves because of the less favorable entrepreneurial investment climate. Thus, constraints in the offer of seed investment weaker its impact in the probability of receiving further financing.

H4: Angel has a strong positive impact on the probability of receiving PE/VC funds in an emerging economy

H5: Seed has a weaker positive impact on the probability of receiving PE/VC funds in an emerging economy

Emerging countries typically have a weaker investor protection and law enforcement facing higher agency problem between investors and entrepreneurs (Groh and Wallmeroth, 2016). To deal with a riskier ecosystem, investors select deals that usually occurs between entrepreneurs whom they share a social connection. Social connection serves as a guarantee of good behavior, reducing agency problem (Croce et al., 2018). As deals are more driven by social connection than management skills or industry knowledge, single founder negative impact in the probability of receiving PE/VC funds is weaker in emerging markets.

H6: Single founder has a weaker negative impact on the probability of receiving PE/VC funds in an emerging economy

During the screening process, investors not only evaluates the founding team but also the product (Alemany and Villanueva, 2014). PE/VC firms may invest strictly in one vertical because of industry knowledge, while others may use a multi-vertical strategy to mitigate risk. According to Roeder et al. (2018), there is a significant relationship between product or service offered and the probability of receiving funds. Thus, we may expect that FinTechs in some categories attracts more investment than others.

Regarding the attractiveness of the country, GDP growth has a positive impact on the venture capital and private equity industry (Gompers and Lerner, 1998; Félix et al., 2007; Cherif and Gazdar, 2011). Start a new business is more attractive in a growing economy than during a recession. Economic growth creates new business opportunities for entrepreneurs and it creates a more optimistic scenario. An improve in growth forecast would increase entrepreneur willingness to quite a job and apply to a project (Gompers and Lerner, 1998).

Economic Freedom is a measure of property rights, financial freedom, and trade freedom. Legal rights have a positive effect on start-up financing because it protects borrowers and lenders (Groh and Wallmeroth, 2016). For instance, companies in countries with best property protection have in average 44% of external finance against an average of 38% in the other countries (Nofsinger and Wang, 2011). However, corruption negatively impacts entrepreneurship as it increases uncertainty and the cost of doing business when firms need to bribe officials (Cherif and Gazdar, 2011).

FinTechs are more likely to receive funding in countries with better Financial development which comprises financial institutions, market, and products. According to Cumming and Schwienbacher (2018), FinTechs may get a competitive advantage when located with the main industry player. Having access to human or financial resources generates economies of scale. The author used the Global Financial Center Index 18 and showed that FinTech investments are more pronounced in countries with a major financial center. Considering financial market and products, an active stock market facilitates successful PE/VC exit through initial public offerings (Haddad and Hornuf, 2016). Stock Market increases venture capital investment (Gompers and Lerner, 1998; Cherif and Gazdar, 2011; Tykvova, 2018), and it is one of the main drivers of private equity activity in Europe (Mihai, 2015).

Research and Development expenses (R&D) positively influence PE/VC investment (Cherif and Gazdar, 2011). A higher level of R&D expenses increases the number of entrepreneurs with promising ideas to create a new business. Similarly, some authors

investigate the positive impact of patents and of the innovation index from INSEAD (Groh and Wallmeroth, 2016).

Corporate tax negatively impacts PE/VC financing. On one hand, corporate tax reduces investors return. On the other hand, it reduces the incentives for a worker to become entrepreneurs (Gompers and Lerner, 1998). To exemplify, many countries have put tax incentives in place to encourage angel investments (Lerner et al., 2018).

Our model does not consider the following country-specific variables. First, the unemployment rate has a limited impact on private equity activity (Mihai, 2015). Neither it is statistically significant for FinTechs which opportunity instead of necessity is the main driver (Haddad and Hornuf, 2016). Second, the interest rate does not significantly affect venture capital activity (Cherif and Gazdar, 2011) nor private equity activity (Mihai, 2015). Last, Total Entrepreneurial Activity Index (TEA) from Global Entrepreneurship Monitor (GEM) has an insignificant impact on investor financing (Félix et al., 2007). According to the author, the TEA index captures both high and low growth entrepreneurial activity, however, investors are only interested in the later one.

3. Methodology

3.1. Data and variables

CrunchBase is our single-source of company-specific data. It contains detailed information on FinTechs profile and their financing rounds (Haddad and Hornuf, 2016). Several studies integrated CrunchBase data with other sources (Dalle at al., 2017). We pooled country-specific data from an array of sources. First, GDP Growth is from The World Bank and OECD national accounts. Second, The Economic Freedom is from The Heritage Foundation. Third, Financial development index is from the International Monetary Funds (IMF). Fourth, R&D expenses are from the UNESCO Institute for Statistics. Last, the Corporate tax is from the Doing Business Project of the World Bank.

Founded in 2007, CrunchBase increased in coverage since then (Dalle at al., 2017). The database offers free academic research access attracting attention not only from the PE/VC industry but also from scholars. The database has three fundamental groups of information: company, people, and funding rounds. Select contributors can add information to the CrunchBase platform which is then reviewed by the data set team before going online (Croce et al., 2018). Thus, data accuracy and completeness vary, and some specific dimensions have limited information (Roeder, Jan, et al.,2018). We accessed CrunchBase data using an academic license, during the period between June and December 2018.

In CrunchBase, companies select their own category. To build our sample, we first filtered for the category FinTech. Although some start-ups have over to five categories and others have just one, we used the self-declared category. Figure 1 presents the initial selection of 3,454 FinTechs created between 2008 and 2016. Therefore, we cleaned all the missing information reducing the original sample by 27%, or 930 firms, to a final sample of 2,524 companies. First, 94 companies have closed as operational status. Second, another 226 companies have no information on the country of origin. Last, 610 FinTechs have no data about the founders.

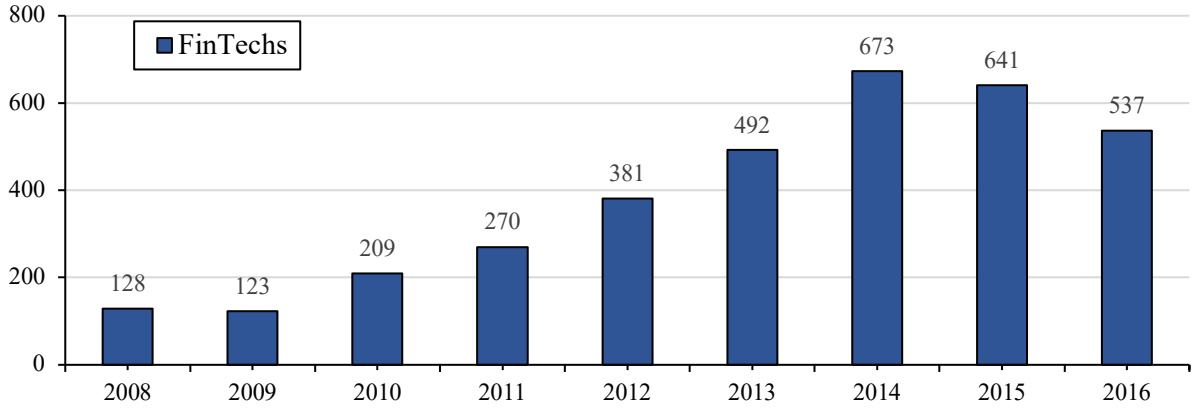

FIGURE 1. FINTECH FORMATION BY YEAR

Our dependent variable is whether the FinTech received external capital in the form of venture capital or private equity. This PE/VC response variable is a binary that takes 1 when the FinTech received capital funding in the following years until December 2018 and takes 0

otherwise. One limitation of this study is that some companies may still receive capital in the following years after 2018 since it is an uncensored panel.

Spiegel (2013) suggest that there is no definition of early-stages starts-ups success. Funding received is a metric of interim success as start-ups are more likely to survive when they have access to capital. Academic researches often use this metrics (Kerr at al., 2011; Croce et al.,2018; Lerner at al., 2018). As our sample have limited representativeness in other response variables: only 1.2% of FinTechs went public, 3.2% of the deals have company valuation, and 2.7% of firms closed. We used venture capital or private equity funding because 37% of FinTechs have received PE/VC.

Our empirical model includes 12 determinants on the probability of receiving PE/VC funding, including both company-specific and country-specific. Table 1 presents a summary of all variables. Among company-specific variables, we created a dummy variable Angel to test our first hypothesis. Angel takes 1 when the FinTech received angel finance and 0 otherwise. Similarly, for the second hypothesis, a dummy variable Seed captures FinTechs that received seed finance. Another dummy variable called Single Founder test our third hypothesis. It takes 1 when the FinTech has only one declared founder in CrunchBase and 0 when it has two or more founders. In addition, for hypotheses four, five, and six we created an interaction term between the Angel, the Seed and the Single Founder with an Emerging country. Seed Emerging and Angel Emerging takes 1 when the FinTech location is in an emerging market and received angel or seed, while Single Founder Emerging captures FinTechs in an emerging market that has only one founder.

We grouped our sample into five categories of FinTechs. We used the same classification proposed by Roeder et al. (2018) in addition to a fifth category for cryptocurrencies. To exemplify, financing category contains loans, factoring, and crowdfunding; while payment contains mobile payments, prepaid and credit cards. Asset

management has companies offering robot-advice or personal finance services. Last, the other group contains, for instance, InsurTech and B2B solutions. We created four dummies variables that capture companies in financing, payment, asset management, and cryptocurrency categories.

TABLE 1: VARIABLES

Variables	Definition	Source	Role	Signal
PE/VC	Dummy variable that takes 1 if the FinTech received PE/VC	CrunchBase	Dependent Variable	
Angel	Dummy variable that takes 1 if the FinTech received angel	CrunchBase	H1	+
Seed	Dummy variable that takes 1 if the FinTech received seed	CrunchBase	H2	+
Single Founder	Dummy variable that takes 1 if the FinTech has only one founder	CrunchBase	H3	-
Angel Emerging	Interaction term that takes 1 if the FinTech is located in an emerging market and received Angel	CrunchBase	H4	+
Seed Emerging	Interaction term that takes 1 if the FinTech is located in an emerging market and received seed	CrunchBase	H5	-
Single Founder Emerging	Interaction term that takes 1 if the FinTech is located in an emerging market and has only one founder	CrunchBase	H6	+
Financing	Dummy variable that takes 1 if the category is financing	CrunchBase	Control Variable	+
Payment	Dummy variable that takes 1 if the category is payment	CrunchBase		+
Asset Management	Dummy variable that takes 1 if the category is asset management	CrunchBase		+
Cryptocurrency	Dummy variable that takes 1 if the category is cryptocurrency	CrunchBase		+
GDP Growth	GDP difference in local currency between 2016 and 2008	World Bank and OECD		+
Economic Freedom	Country rank position regarding Economic Freedom, year of 2016	The Heritage Foundation		-
Financial Development	Index for financial institutions and market development, year of 2016	International Monetary Funds		+
R&D Expenses	R&D expenses as a percentage of GDP in 2015	UNESCO Institute for Statistics.		+
Corporate Tax	Corporate tax difference between 2016 and 2008	The Doing Business project		-

Country-specific variables are numerical. First, GDP Growth is the GDP difference in local currency between 2016 and 2008. Second, The Economic Freedom Index covers 12 freedoms such as property rights and financial freedom. It ranks countries in descending order where the first position means the highest levels of economic freedom. Third, Financial Development 2016 index measures countries depth, access, and efficiency of the financial institutions and market. Fourth, R&D Expenses is gross domestic expenditure on research and development as a percentage of GDP. It considers basic or applied research and experimental development. We use the last year of data 2015 as a proxy for 2016. Last, Corporate Tax is the difference in business profit taxes between 2016 and 2008.

3.2. Econometric Model

In this study, we compare FinTechs that received with those that did not receive private equity or venture capital funds. Our panel data contains observations of 2,524 companies, from 76 countries, for the period between 2008 and 2018. We estimate a Logit model using the Stata software. The dependent variable is a binary outcome, meaning 1 if the company received external funding and zero otherwise. We use a random-effects regression because the fixed-effects model could not measure our control variables which are all country dependent. The panel data controls for the foundation year as only FinTechs that received PE/VC funds have the year of the deal. The analysis uses the following model:

$$Pr(y = 1|x) = \beta_0 + \beta_1 X_1 \ldots + \beta_k X_k + \varepsilon$$

Model 1 reports the results for the base model, including control variables, in addition to the effect of the angel and the seed finance and their interactions term with the emerging market. In model 2, we added to the base model the single founder effect also with the emerging market interaction term. In models 3, we tested the base model with our six hypotheses.

Moreover, a residual analysis checks for error homoscedasticity hypothesis confirming the need for robust standard errors.

4. Results

In our sample, 10% of the FinTechs have received an angel round, while 47% of them have received a seed. As for founding team, 36% of firms are single founders, while 64% have two or more founders. The majority of companies have two founders 37%, in line with prior studies where the majority of the start-ups have two co-founders (Spiegel at al., 2013). FinTechs typically receive capital during the first or second year, respectable 23% and 26% of deals.

FinTechs are spread across 76 different countries, being 34 classified as a developed economy and 42 as an emerging market. The classification criterion is the International Monetary Fund (IMF) definition by GDP per capita from the year 2018. Emerging countries account for 15% of our sample, both as the percentage of total companies and as the percentage of those that received PE/VC capital. The share of FinTechs from developing countries went up from 12% in the first years up to 18% more recently. High deal competition in developed economies increased the number of deals in emerging economies where the relative price is lower (Minardi and Bortoluzzo, 2017).

Table 2 represents statistics for developed and emerging countries. All figures are in line with our hypotheses. FinTechs that received an angel, or a seed round show a higher percentage of PE/VC, namely 39% and 43%, while companies with a single founder show a lower percentage 29%. Regarding country developmental stage, the angel has more impact in an emerging market, while the seed and the single founder has less impact in an emerging market. According to Pearson's Chi-squared test, the angel is not statistically significant for follow-on finance. Furthermore, it suggests that any variable is statistically significant in emerging countries.

TABLE 2: ANGEL, SEED AND SINGLE FOUNDER IMPACT ON RECEIVING PE/VC FUNDS FOR DEVELOPED AND EMERGING COUNTRIES

Hypotheses	**Developed**		**Emerging**		**Total**	
-	PE/VC	No PE/VC	PE/VC	No PE/VC	PE/VC	No PE/VC
Angel	38%	62%	43%	57%	39%	61%
No Angel	36%	64%	35%	65%	36%	64%
Pearson chi2	0.3309		1.2908		0.983	
Seed	44%	56%	35%	65%	43%	57%
No Seed	30%	70%	36%	64%	31%	69%
Pearson chi2	43.1986***		0.0343		36.0112***	
Single Founder	28%	72%	36%	64%	29%	71%
Team Founder	42%	58%	36%	64%	41%	59%
Pearson chi2	40.7900 ***		0.0173		35.2182***	

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$
Pearson Chi-square test for categorical variables

Considering the FinTech category, 31% are in financing, 19% are in payment, 11% are in asset management, 7% are in cryptocurrency, and 33% are in other. Over time, the share of FinTechs in asset management increased from 10% to 16%, in cryptocurrency it increased from 1% to 9%. Table 3 suggests that the categories of financing and payments ventures are more likely to receive follow-finance compared to asset management, cryptocurrencies, and the other group.

TABLE 3: CATEGORIES IMPACT ON RECEIVING PE/VC FUNDS

-	Financing	Payments	Asset Management	Crypto.	Other
PE/VC	41%	43%	33%	32%	30%
No PE/VC	59%	57%	67%	68%	70%

Table 4 presents the statistics of the country-specific variables, all figures support the existing literature except Corporate Taxes. First, average GDP Growth is higher for FinTechs that received PE/VC capital. Second, average Economic Freedom is slightly smaller for those with PE/VC finance suggesting that countries with a better rank of Economic Freedom (meaning lower position) has a positive impact on financing. Third, Financial Development is higher among those companies that received funds. Fourth, R&D Expenses are higher for FinTechs that received PE/VC. Corporate Tax contradicts the expected negative effect. Indeed,

companies that received PE/VC have in average a reduction of 1.7 percentage point of tax between 2016 and 2008 against a 2.2 from those that did not receive PE/VC.

TABLE 4: CONTROL VARIABLE IMPACT ON RECEIVING PE/VC FUNDS

	Average	Standard Deviation	Minimum	Maximum
GDP Growth				
PE/VC	0.198	0.209	-0.059	0.886
No PE/VC	0.177	0.177	-0.261	0.886
Economic Freedom				
PE/VC	72.669	7.946	38.230	88.550
No PE/VC	73.144	7.655	43.490	88.550
Financial Development				
PE/VC	0.780	0.148	0.121	0.937
No PE/VC	0.759	0.176	0.098	0.937
R&D Expenses				
PE/VC	2.301	0.833	0.000	4.266
No PE/VC	2.110	0.881	0.000	4.266
Corporate Tax				
PE/VC	-1.747	3.899	-20.900	12.800
No PE/VC	-2.231	4.665	-20.900	8.300

Table 5 presents correlations among country-specific variables. The correlation and VIF coefficients are below levels for which multicollinearity would be an issue

TABLE 5: CORRELATION MATRIX

	(1)	(2)	(3)	(4)	(5)
GDP Growth	1				
Economic Freedom	-0.4262	1			
Financial Development	-0.5424	0.6629	1		
R&D Expenses	-0.3375	0.4588	0.6288	1	
Corporate Tax	0.1314	-0.1344	-0.116	0.2149	1
VIF	1.44	1.83	2.76	1.94	1.2

Note: Variance inflation factor (VIF) test for multicollinearity

Our regressions estimate the impact of company-specific and country-specific determinants in the probability of receiving PE/VC funding. Table 6 presents the determinants of PE/VC funds.. We find that the signal of the angel and the angel interaction term with emerging market coefficients are in line with hypotheses one and four. However, these

coefficients are not statistically significant. Kerr at al. (2011) also suggest that business angel is not statistically significant in accessing follow-on financing. Difficulties in identifying the business angel population may offset the impact of the angel investor (Croce et al., 2018). For instance, the business angel presence in our sample 10% which is smaller than the seed penetration of 47%.

Having received s seed finance has a positive and statistically significant influence on follow-on PE/VC rounds, we do not reject our second hypothesis. Indeed, having received seed generates an increase of 61% in the odds of receiving PE/VC capital. This result is in line with the existing literature on the seed role as a certification of deal quality and as an active investor providing FinTechs access to additional networking such as consultants or investment bankers (Gompers and Lerner, 1998; Croce et al., 2018). Considering the developmental stage of a country, the seed magnitude in an emerging market is weaker compared to developed countries as presented in figure 2. However, the interaction term between seed and emerging market is not statistically significant in our model.

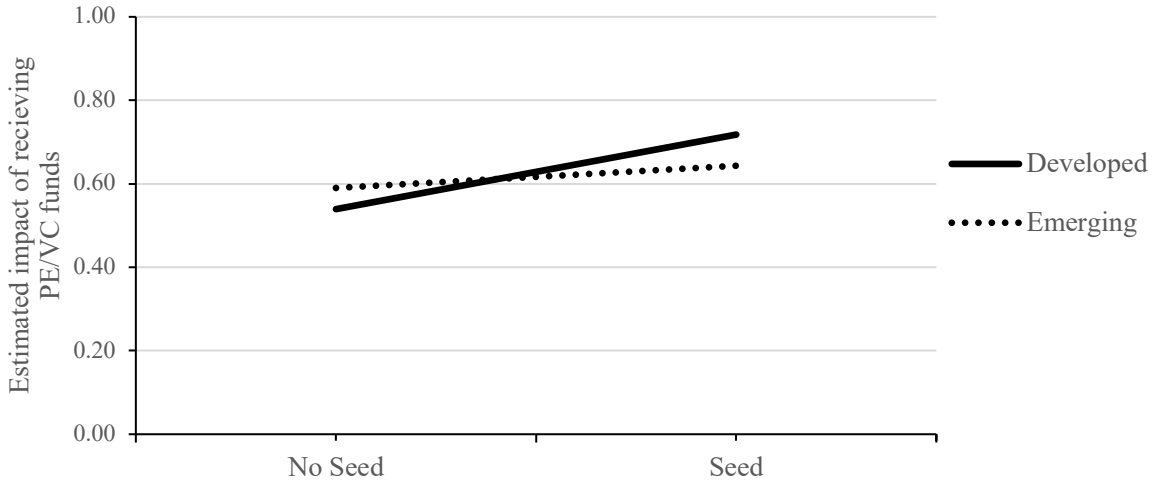

FIGURE 2. SEED IMPACT ON RECEIVING PE/VC FUNDS FOR DEVELOPED AND EMERGING COUNTRIES

Our results do not reject the third hypothesis of the single founder negative influence on PE/VC funding. Team founders contribute to networking, skills, and industry knowledge, attracting

investor attention (Stam and Schutjens., 2005; Spiegel at al., 2013). Having a single founder, FinTechs are 40% less likely to receive PE/VC compared to team founders. Although the interaction term between the single founder and an emerging country is not statistically significant, it has a positive coefficient suggesting a weaker influence in emerging countries compared to developed economies as shown in figure 3.

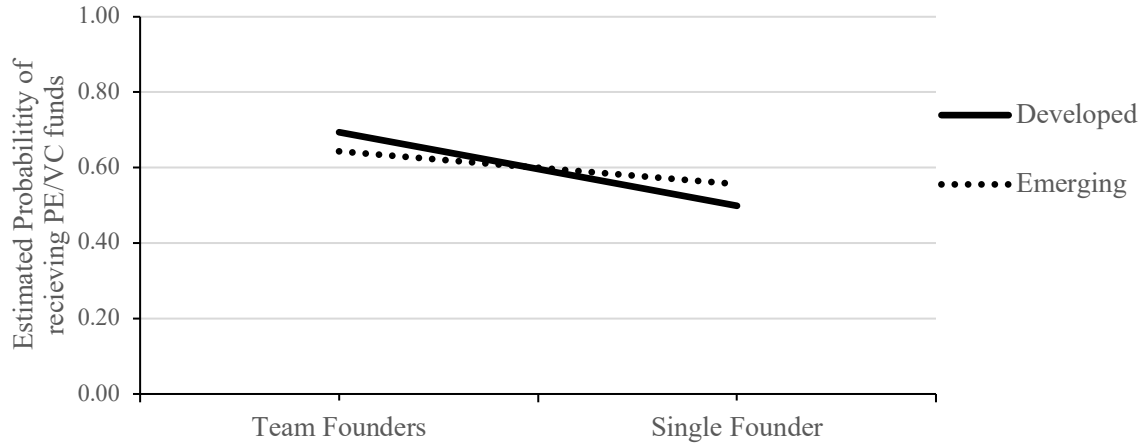

FIGURE 3. SINGLE FOUNDER IMPACT ON RECEIVING PE/VC FUNDS FOR DEVELOPED AND EMERGING COUNTRIES

Individual entrepreneurial talent is likely to vary more in emerging markets where education is not consistent across the population (Lerner et al., 1997). This paper leaves unanswered the question if entrepreneurs profile differs. From our sample of 2,524 FinTechs, only 57% have information on founders' education. The percentage of companies that received PE/VC is 43%, higher than the total sample percentage of 37%, suggesting a bias where companies more likely to receive PE/VC have a more complete profile in CrunchBase. From FinTechs with complete founder profile, the MBA/PhD percentage is 32% in developed countries against 25% in emerging, while the percentage of Top 200 Universities from CWUR rank is 44% in developed countries against 22% in emerging. These numbers suggest that entrepreneurial talent is more consistent in developed countries.

In terms of control variables, our model finds that the FinTech category influences the probability of receiving PE/VC funding. More traditional categories from the financial sector,

namely financing and payment, attract more PE/VC capital. Financing and Payments have a positive and statistically significant coefficient in the three models, while asset management and cryptocurrencies are not statistically significant when compared to the other group. Hence, FinTech product or service offered influence investors decision which is in line with Roeder et al. (2018).

We find statistical significance at the 5% level in every country-specific variable except the corporate tax. All coefficients are in line with the existing literature. First, GDP growth positively influences FinTechs financing (Gompers and Lerner, 1998; Félix et al., 2007; Cherif and Gazdar, 2011). Second, the level of economic freedom in a country, in the form of a smaller rank according to The Heritage Foundation, impact PE/VC activity (Cherif and Gazdar, 2011; Nofsinger and Wang, 2011; Groh and Wallmeroth, 2016). Third, financial development positively impacts the PE/VC industry (Gompers and Lerner, 1998; Cherif and Gazdar, 2011; Mihai, 2015; Tykvova, 2018; Haddad and Hornuf, 2016). Last, R&D expenses positively impact FinTech financing (Cherif and Gazdar, 2011; Groh and Wallmeroth, 2016).

The corporate tax insignificant could be partially explained by the existing anomalies where countries with high corporate tax rates still have high entrepreneurial activity (Groh and Wallmeroth, 2016). The expected negative influence of corporate tax may only hold in single countries analysis as estimated by Gompers and Lerner (1998) using data from The United States.

As for the strength of determinants, table 6 shows that financial development and GDP growth are key drivers of PE/VC activity. Although FinTechs are growing fast in emerging markets, the market remains highly concentrated as The United States and The United Kingdom still accounts for 55% of FinTechs companies and 58% of FinTechs PE/VC rounds.

TABLE 6: DETERMINANTS OF RECEIVING PE/VC FUNDS

Variable		Model 1		Model 2		Model 3	
		Coefficient	Odds	Coefficient	Odds	Coefficient	Odds
Angel	H1	0.001	1.001	-	-	-0.009	0.991
		(0.160)				(0.163)	
Seed	H2	0.566***	1.761	-	-	0.478***	1.613
		(0.093)				(0.095)	
Single Founder	H3	-	-	-0.603***	0.547	-0.510***	0.601
				(0.100)		(0.102)	
Angel Emerging	H4	0.123	1.131	-	-	0.148	1.160
		(0.361)				(0.362)	
Seed Emerging	H5	-0.377	0.686	-	-	-0.339	0.713
		(0.245)				(0.250)	
Single Founder Emerg.	H6	-	-	0.350	1.420	0.284	1.329
				(0.248)		(0.255)	
Financing		0.460***	1.585	0.498***	1.645	0.471***	1.601
		(0.108)		(0.109)		(0.109)	
Payment		0.522***	1.685	0.572***	1.772	0.526***	1.692
		(0.125)		(0.123)		(0.125)	
Asset Management		0.019	1.019	0.068	1.071	0.033	1.034
		(0.155)		(0.153)		(0.155)	
Cryptocurrency		0.022	1.023	0.038	1.038	0.000	1.000
		(0.176)		(0.176)		(0.176)	
Emerging		0.292	1.340	0.039	1.040	0.161	1.175
		(0.346)		(0.331)		(0.364)	
GDP Growth		1.234***	3.435	1.250***	3.491	1.264***	3.540
		(0.309)		(0.308)		(0.310)	
Economic Freedom		-0.032**	0.969	-0.03**	0.971	-0.032**	0.968
		(0.010)		(0.010)		(0.010)	
Financial Development		1.835***	6.262	1.944***	6.986	1.916***	6.793
		(0.447)		(0.449)		(0.451)	
R&D Expenses		0.324***	1.382	0.308***	1.361	0.306***	1.358
		(0.082)		(0.083)		(0.082)	
Corporate Tax		0.003	1.003	0.002	1.002	0.001	1.001
		(0.011)		(0.011)		(0.011)	
Constant		-1.129	0.323	-0.885	0.413	-0.917	0.400
		(0.815)		(0.814)		(0.808)	
Sample Size		2524		2524		2524	
Wald chi2(10)		137.67***		137.53***		160.33***	
Correct Classification		64.5%		64.3%		64.3%	

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

To test for the robustness of our regressions, we applied a Breusch-Pagan (1979) and we rejected the null-hypotheses of constant variance (homoskedasticity) with a p-value of 0.0000. Hence, the Breusch-Pagan test confirms the need to use robust standard error in the regression. A Wald Chi-Squared tested for the significance of our explanatory variables and we rejected the null-hypotheses of no significance with a p-value of 0.000. Comparing the three models, the correct classification percentage of 64% shows an acceptable and similar predictive accuracy. Furthermore, a slightly higher Wald Chi-Squared of 160 is in favor of our third model.

5. Conclusions

FinTechs are attracting growing interest because of their ability to generate economic growth and financial inclusion. However, FinTechs benefits are conditional to their survival. Not only for their capital but also for their previous entrepreneurial experience, PE/VC investors increase the survival likelihood. As 70% of the PE/VC rejections occur at first sight (Riding et al., 2007), investigating the determinants of PE/VC is important for entrepreneurs looking for capital and for policymakers to design public incentives.

In recent years, FinTech funding raised a significant amount of money reaching a record of $27.4 billion according to CB Insights (2018). We provide evidence on the growth of emerging market deals, from 2008 to 2018 the share of emerging countries went up from 12% to 18% in our sample. This pattern is consistent with other cross-countries investigations (Groh and Wallmeroth, 2016; Minardi and Bortoluzzo, 2017).

This article analyzes the determinants of FinTech funding using a random-effects model on a panel data containing 2,524 companies, covering 76 countries, for the period from 2008 to 2018. Our empirical model has 12 determinants on the probability of receiving PE/VC funding, including company-specific and country-specific variables. Research has shown that GDP growth, economic freedom, financial development, and R&D expenses are statistically

significant for start-up funding (Gompers and Lerner, 1998; Félix et al., 2007; Cherif and Gazdar, 2011; Nofsinger and Wang, 2011; Mihai, 2015). Our findings confirmed that these country-specific determinants are also relevant in the FinTech industry. Surprisingly, we found that the corporate tax is not statistically significant. This result suggests future research on the impact of corporate tax reductions. For instance, investigate PE/VC activity after corporate taxes reduction using a single country database or clustering countries according to their taxes level.

Considering company-specific determinants, we control for the category using four dummies: financing, payment, asset management, and cryptocurrency. We confirmed the increase in the creation of asset management and cryptocurrency companies, their share went up from 10% to 21%. However, these categories are not statistically significant in the probability of receiving PE/VC capital. FinTechs in financing and payment categories are the majority of our sample, these categories are positive and statistically significant in the probability of receiving PE/VC follow-on finance.

We tested for the impact of the angel and the seed investors. The impact of having received an angel finance is positive, however not statistically significant. Existing difficulties in identifying the business angel population may partially reduce its impact (Croce et al., 2018). The seed positive influence in FinTech PE/VC funding reinforces that incentives to facilitate the startup ecosystem are beneficial to economic growth. Our finding supports public policies, including, but not limited to, the creation of incubators, hubs, grants, and, mentoring programs.

Our finding endorses not only that FinTechs should apply for the seed funding but also that they should look for co-founders with complementary skills. As team size contributes to entrepreneurial talent, policymakers can influence it by providing differential tax benefits to team founders start-ups (Mayer-Haug et al., 2013). This paper leaves unanswered the questions of how education and working experience impacts the probability of receiving PE/VC funds. CrunchBase platform has information on founder profile, however, only 56% of our sample has

education and 14% has working experience. In both cases, the percentage of PE/VC finance was significantly higher than the total sample. Thus, we decided not to use this information. Further research should combine information from CrunchBase together with other sources of founder profile. For instance, Spiegel at al. (2013) have combined CrunchBase and LinkedIn data.

Overall, this research finds that FinTech funding determinants have a similar magnitude and direction with those from start-ups. Although FinTechs become a global phenomenon, the market is still highly concentrated in countries with a strong financial industry. Entrepreneurs that attempt to found FinTechs in emerging markets will face more constraints in uncertainty or credit availability. Our investigation suggests that the role of seed as a quality certification and team founder as complementary skills is weaker in emerging markets, however, they are not statically significant.

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